6.1 - part 2

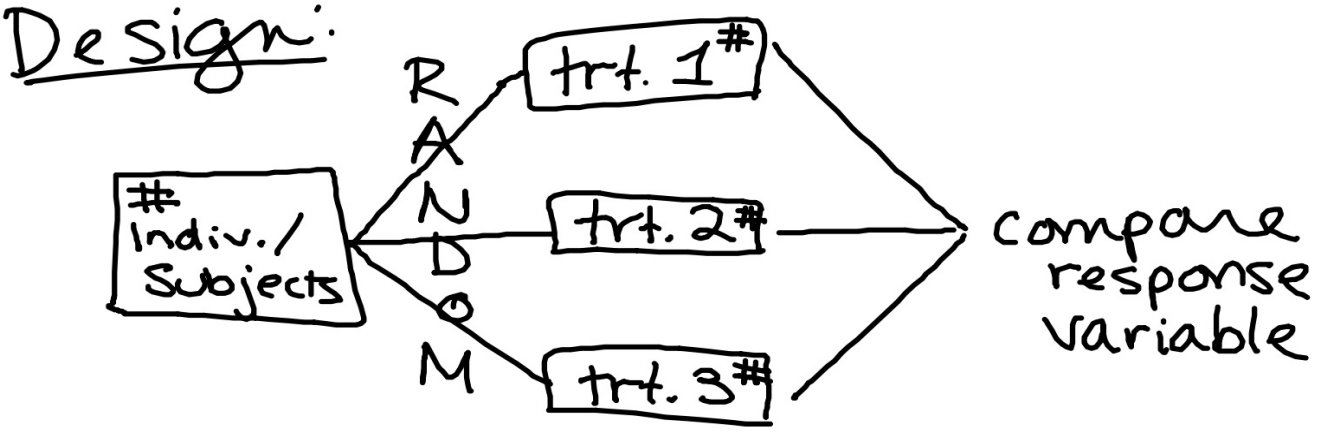
* random
* control - sunlight & H_2O
* trials
  replicate

— draw pictures

Randomized Comparative Expt.

aka: Completely Randomized Design

Design:



Ex:

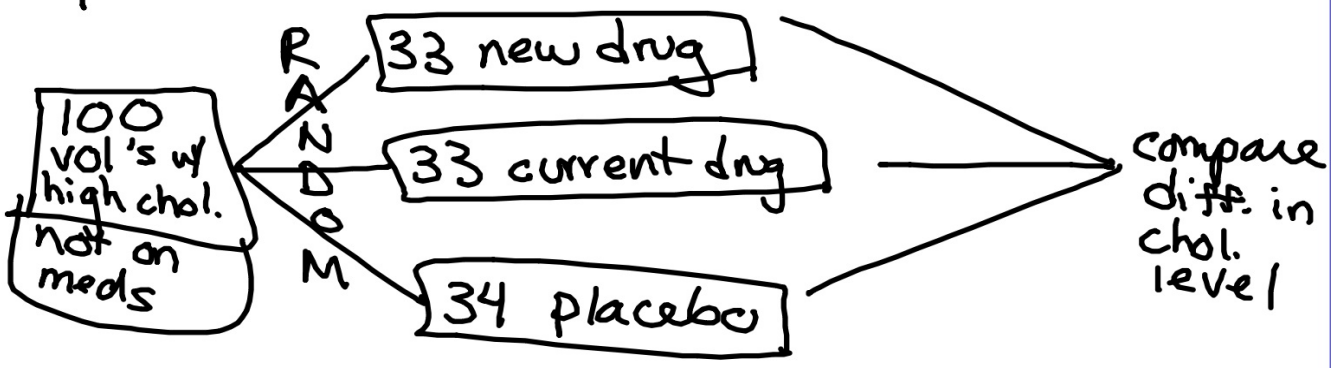
control – no trt, old trt
"baseline"

control group vs. placebo group

* ethics *

Ex 1

- new drug
- current drug
- 100 vol's (not on meds)
- chol. level (diff.)
- placebo

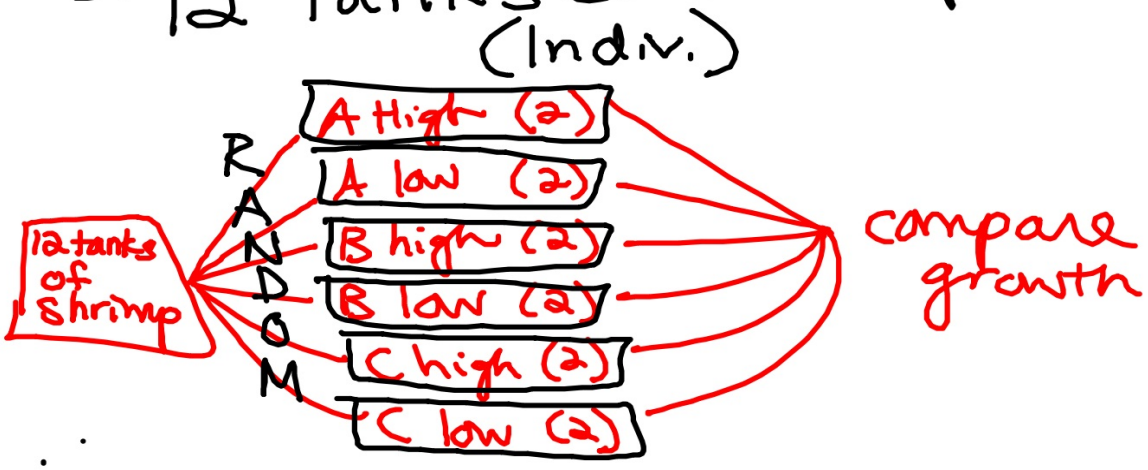


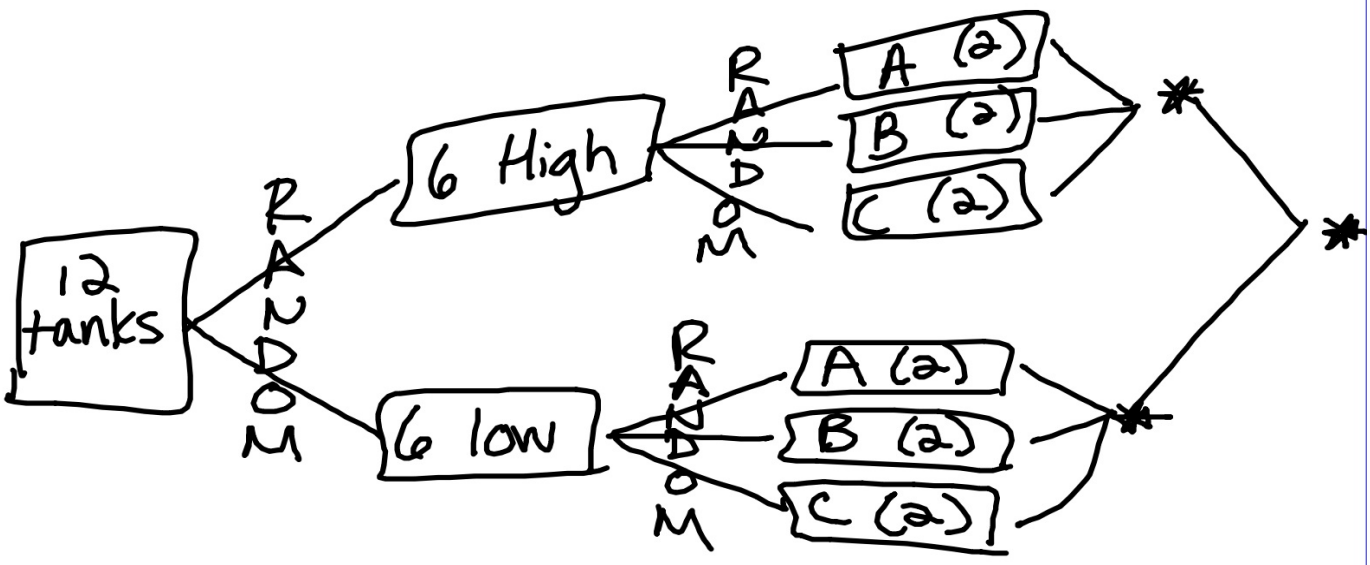
Ex 2 / R - shrimp growth

Ex - salt levels (low & high)

Ex - growth nutrients (A, B, C)

- 12 tanks of shrimp





*=compare growth

2 Factor Design

Logic:

- subjects/indiv $\Longrightarrow$ trts.
- random
- comparison of resp. variables

* Make a conclusion about our pop.

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3 Principles:

1. Control of Lurking Variables
2. Randomization of exp. units to trts.
   * reduces lurking var's & bias

③ Replication:
- many times
- many diff. subjects/indiv.

Statistical Significance:
- see a response so many times, that we can believe it is the true response (not just chance)

Example 3: As dogs age, what they have diminished joint and hip health that may lead to pain and reduce a dog's activity level. This reduction in activity can also lead to other conditions such as weight gain and lethargy. A study is to be conducted to see which of two dietary supplements, glucosamine or chondroitin, is more effective in promoting joint and hip health. Researchers will randomly select 300 dogs from different large veterinary clinics around the county to participate in the study. Changes in joint and hip health will be evaluated after 6 months of treatment.

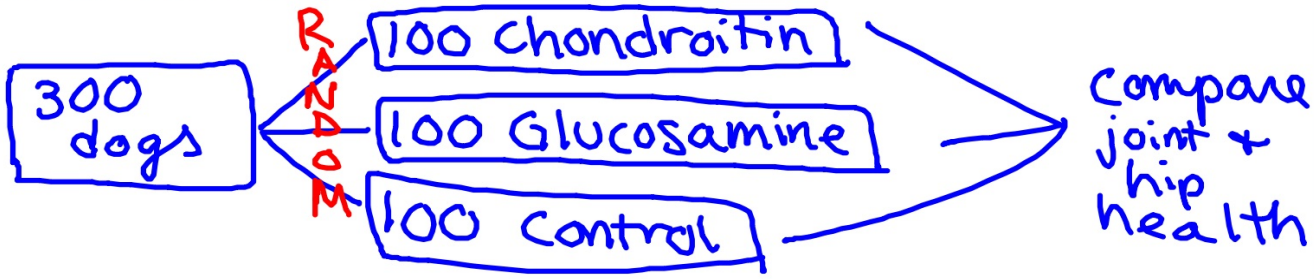
What are the treatments? Chondroitin and Glucosamine

What are the subjects/individuals? Individuals = Dogs

What is the response variable? joint and hip health

What would be the advantage of adding a control group to this study? we could see how the dogs joint and hip health is naturally, and compare that to how it is on the meds

Design the experiment below (including your control group)



Example 4:

The dentists at a dental clinic would like to determine if there is a difference between the number of new cavities in people who eat an apple a day and in people who eat less than one apple a week. They are going to conduct a study with 50 people in each group.

50 clinic patients who report that they routinely eat an apple a day and 50 clinic patients who report that they eat less than one apple a week will be identified. The dentists will examine the patients and their records to determine the number of new cavities the patients have had over the past two years. They will then compare the number of new cavities in the two groups.

1) Why is this an observational study and not an experiment? There is no treatment. The patients say that they do or do not eat apples each day.

2) What lurking variables are there in the design of this study? other foods that they eat, brushing teeth and flossing, dental care, etc.

3) Explain the concept of confounding in the context of this study. Use your lurking variables from above to help. Confounding is when we cannot separate the effects of the apples from the other lurking variables above. We cannot separate how much of the cavities is due to the apples and how much is due to teeth brushing, or other foods, or dental care, etc.

Example 5: A researcher wants to conduct a study to test whether listening to soothing music for 20 minutes helps to reduce blood pressure in patients with high blood pressure, compared to simply sitting quietly in a noise-free environment for 20 mins. 100 patients with high blood pressure at a large medical clinic are available for the study. **Design this experiment. Discuss possible sources of bias and lurking variables.**